

ACQUISITION AND TRACKING OF THE LCROSS IMPACT SITE WITH KECK-II. A. R. Conrad¹, J. E. Lyke¹, D. Wooden², C. Woodward³, M. DiSanti⁴, P. Lucey⁵, ¹W.M. Keck Observatory, 65-1120 Mamalahoa Hwy, Kamuela, HI, 96743, ²NASA Ames Research Center, Moffett Field, CA 94043, ³Dept. of Astronomy, U. Minnesota, 116 Church St, SE, Minneapolis, MN 55455, ⁴Planetary Systems Laboratory, NASA/GSFC, Code 693.0, Greenbelt, MD 20771, ⁵Hawaii Institute of Geophysics and Planetology, University of Hawaii, 2525 Correa Road, Honolulu, Hawaii 96822

Introduction: We plan to use the Keck-II high-resolution, near-infrared, spectrograph (NIRSPEC) to measure the subliming water vapor in the LCROSS ejecta curtain [1]. The impact of the 2200 kg kinetic impactor will result in a ~6000 kg plume, ~30 kg of which is expected to be water ice [2]. We hope to detect the spectral signature of that water by keeping the NIRSPEC slit fixed on the plume for a sufficient length of time to acquire the needed spectra.

Tracking and Guiding: The Keck-II-NIRSPEC system provides two acquisition and guide cameras: an infrared, slit-viewing, camera sensitive out to 2.5 microns and with a field of view of 46 arcseconds on a side; and an optical-CCD annular guider with an outer diameter of 3.5 arcminutes (see fig. 1). On April 7th, 2009, during a half-night on Keck we proved that, by using both of these cameras for different aspects of acquisition and guiding, it will be possible to carry out the LCROSS observation. We will report on our methods for limiting lunar flux to levels detectable by the two NIRSPEC guiders; and on our methods for offset-guiding, in a rotating field, by locking on lunar features.

Future: We will also discuss briefly other possible observing modes for the moon, which, following our tests on April 7th, we now feel may be possible with Keck. This discussion will include a discussion of adaptive optics and, in particular, the challenges that make the use of that observing mode unlikely, but not out of the question, for Keck observations of the moon.

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References: [1] McLean et al. 1998, SPIE, 3354, 566. [2] Ennico K. (2009) *LPS XL*, Abstract #1878.

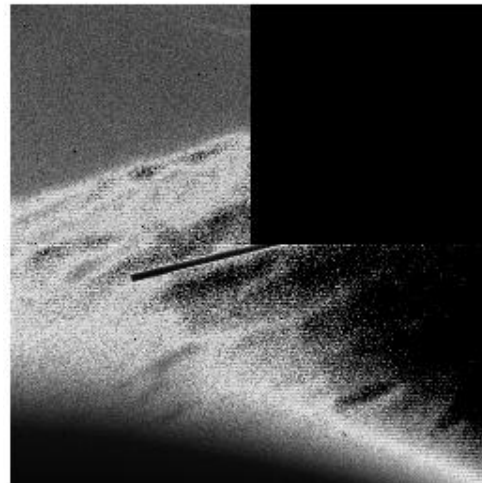
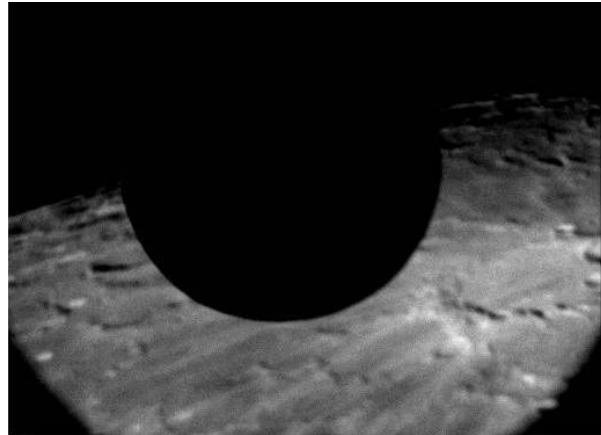


Figure 1. Representative images of the lunar surface taken with the annular guide camera (top) and the infrared, slit-viewing, guide camera (bottom).